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PILOT TRAINING PROGRAM IN UNDERGRADUATE EDUCATIONAL RESEARCH, SPRING TRIMESTER RESEARCH TRAINING PROJECT (MAY-AUGUST 1967).

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Major objectives of a 1-trimester research training project were (1) to introduce outstanding undergraduates in the behavioral and social sciences to educational research and (2) to introduce outstanding undergraduates currently preparing for the teaching profession to the field of educational research as a possible future career. Approximately half of the 18 juniors and seniors participating were drawn from the College of Education, half from the Liberal Arts College. The program consisted of course work, individual study, and research apprenticeship. It was anticipated that students would (1) develop basic competencies in measurement techniques and statistical designs appropriate for research in an educational setting, (2) conduct individual research in a particular discipline with emphasis on its educational aspects, (3) participate in ongoing educational research, (4) come into contact with professors from a wide variety of orientations who are engaged in educational research, (5) become familiar with basic data processing, (6) exchange ideas with students from other disiciplines and relate these ideas to educational problems, and (7) develop favorable attitudes toward research in education. Student and staff evaluations indicate success in achieving these goals, particularly the last. Included are 16 tables containing data from the evaluations. (JS)

FINAL REPORT
Grant Nos. OE 2-6-001978, OE 2-6-001979

PILOT TRAINING PROGRAM IN UNDERGRADUATE EDUCATIONAL RESEARCH: SPRING TRIMESTER RESEARCH TRAINING PROJECT

DECEMBER 29, 1967

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

Pilot Training Program in Undergraduate Educational Research: Spring Trimester Research Training Project

Continuation of Grant Nos. OE 2-6-001978
and OE 2-6-001979

Ira J. Gordon
Robert E. Jester

May, 1967 through August, 1967

The training program reported herein was conducted pursuant to a grant from the Office of Education, U.S. Department of Health, Education, and Welfare. Grantees undertaking such projects under Government sponsorship are encouraged to express freely their professional judgement of the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy

University of Florida

Gainesville, Florida

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PILOT TRAINING PROGRAM IN UNDERGRADUATE EDUCATIONAL RESEARCH

During the summer of 1966 a pilot training program in educational research for outstanding undergraduate students was conducted by the Foundations Department of the College of Education. Two major goals were set for this program: 1) to introduce outstanding undergraduates in the behavioral and social sciences to educational research; and 2) to introduce outstanding undergraduates currently preparing for the teaching profession to the field of educational research as a possible future career. The final report resulting from this project supported the viewpoint that the goals were appropriate and generally realized. As a result of the 1966 program, however, some specific recommendations were made. These recommendations were used to shape the program for the summer of 1967.

ORIENTATION OF PROGRAM

The traditional teacher education programs in state colleges of education have stressed the certification requirements of the state. There has been little emphasis upon the future teacher's ability to interpret the multitude of published research reports, to apply research techniques in his own classroom or, indeed, even to apply systematic evaluation to his own teaching endeavors. The course work has traditionally not included systematic study of measurement and statistics or educational research. As a result when the teachers move into the field, they are not equipped to make use of many of the resources readily available to them. In addition, they are not prepared to be of help to the serious educational researcher who attempts to work in their school systems. The result of such lack of preparation can easily bias research results. Due to a lack of understanding, teachers and other public school personnel are likely to behave in ways which make the conduct of research difficult or at times even impossible. Finally, failure to interpret the need for research to the local community restricts the use of the school as a laboratory in educational research.

At the same time, programs in the behavioral and social sciences seldom provide opportunity for their students to become aware of current problems in education. Students in such programs take no courses in education and frequently develop negative reactions to education and educators. The most capable students of these disciplines who pursue graduate study are generally lost to education and educational research both because of lack of exposure to it and relatively negative feelings about it. Some liberal arts graduates do move toward educational research at the graduate level. The most prevalent seem to be students from psychology who move into educational

psychology at the graduate level. Generally such movement comes so late in the educational program that the students have to be either retrained or reoriented in order to operate effectively in an educational setting. If an introduction to educational research could be made for such students at some point in their undergraduate career, it would obviously result in an important saving in time.

The problem, thus, is one of selecting undergraduate students who would normally not be involved in an educational research setting. These students might come from teacher-preparation programs or from liberal arts colleges. Recruitment and the initiation of training for such students prior to their beginning graduate school is extremely important.

The pilot training program during the summer of 1966 provided support for the overall objectives outlined above. A few specific suggestions were made, however, which were implemented in the summer 1967 program. During the 1966 summer program the seminars were conducted on a half-trimester basis. It was felt, upon evaluating the program, that this produced a discontinuity which was unnecessary. The students felt that the seminar in research methods was too far removed from the actual conduct of research. For this reason, the seminar was conducted during 1967 for the entire third trimester or for a period of fourteen weeks. This permitted students to bring problems encountered in other aspects of their work to class. The seminar in issues and problems in education was also conducted through the entire third trimester for the same reason. In light of the evaluation of the program in 1966 the goals of the program were unmodified but the curriculum was changed to permit more continuity and direction of purpose.

The goals of the program were A) to introduce outstanding undergraduates in behavioral and social sciences to educational research and B) to introduce outstanding undergraduates currently preparing for a teaching career to the field of educational research as a possible future occupation.

In relation to these overall objectives, several goals were set. It was expected that students would 1) develop basic competencies in measurement techniques and statistical designs appropriate for research in an educational setting; 2) conduct individual research in a particular discipline with emphasis on its educational aspects; 3) participate actively in ongoing educational research; 4) come into contact with professors who are actively engaged in educational research from a wide variety of orientations;

5) become familiar with basic data processing; 6) exchange ideas with students from other disciplines and the relevance of these ideas to educational problems and; 7) develop favorable attitudes toward research in education.

SELECTION OF TRAINEES

The number of trainees was set at twenty, approximately half drawn from the College of Education and the other half from students in the Liberal Arts College. Major criteria for selection were high level undergraduate performance and recommendation from the student's major department. High level performance was defined for this program to be the attainment of an overall 3.0 grade point average (equivalent to a B average). Generally admission was limited to students classed as juniors and seniors. Although recruitment procedures were initiated early (prior to January 1967) response to the recruiting attempts was relatively low and it was not possible to maintain the 3.0 grade point selection criterion. The additional criterion of favorable letters of recommendation was therefore used as a primary basis for selection. In addition, each prospective candidate was interviewed and his interest in educational research, his reasons for applying to the program, and his intent upon completing the program were discussed. It appears that such a system has merits beyond those of a unitary criterion of grade point average. Several students were on the borderline of an acceptable grade point average but due to personal factors and changes which the students had recently initiated, they were accepted into the program. In all but one case the procedure appeared to be acceptable.

DESCRIPTION OF THE PROGRAM

The program consisted of three main areas: 1) course work, 2) individual study, and 3) active participation in an ongoing research project.

1) Course Work:

A. Seminar in Educational Research. EDF 450. Measurement and Evaluation in Education (specially modified for this program).

I. Forty-five contact hours (three semester hours credit).

2. Dr. Robert E. Jester, Assistant Professor of Education, Program Codirector.

3. Introduction to statistics, measurement and educational research

   a. Introduction to basic descriptive and inferential statistics (through sampling experiments).
   b. Science, the scientific approach, and hypothesis testing.
   c. Research design: meaning, purpose, and principles.
   d. Types of experiments and studies.
   e. Measurement: reliability and validity.
   f. Observation and data collection.
   g. Analysis and interpretation.

4. It must be emphasized that throughout this course a premium was placed on 1) high student participation, 2) the interpretation of published research reports, 3) the conduct of scientific research, and 4) making "research" a lively rather than a dull activity.

B. Seminar in Issues and Problems in Education (Ed 400)

1. Forty-five contact hours (three semester hours credit).
2. Dr. Ira J. Gordon, Professor of Education, Program Director.
3. A group approach to dealing with problems and issues in education including a critical examination of current research and where pertinent involving simple research procedures. Specifically designed for the program, this course highlighted:

   a. Delineation of issues which are philosophical and focus on the former.
   b. Within this seminar, development by each student of an individual area of research and presentation of a paper to the group.
   c. A series of seminar presentations by active researchers in education. Listed alphabetically, they were: Professors William Alexander, Arthur W. Combs, Fred Goodman (University of Michigan), Ralph Kimbrough, William LaVire, William Purkey, Robert Soar and J. B. White. Dr. Goodman demonstrated a games approach to counselor training. The students also attended a lecture by Professor Arthur Coladarci (Stanford University).

C. Each student selected an elective course from the behavioral or social sciences. Examples of courses elected are:

Anthropology:	The nature of culture, the problems of universal functions, pattern, structure, and process.
Geology:	Elements of Geology, selected topics in physical and historical geology.
Political Science:	Urban, suburban, and metropolitan government.
Physical Education:	Organization and conduct of physical education in the elementary school.
Political Science:	American Federal Government, basic principles of the federal constitution. Civil rights, political parties, and the electoral process.

2) Individual Study:

Each student engaged in an independent study under the supervision of a faculty member and received three credit hours for this work. Credit was allowed in Anthropology, Education, Political Science, Psychology, and Sociology. A list of students, advisors, and nature of study is presented in Table 1.

Table 1. Individual Study Activities.

Student	Supervisor	Topic
Ronald Anderson	Dr. Entner	Polytechnical Education in Russia
Nicholas Arroyo	Dr. Curran & Dr. Gordon	Educational Television in Dade County
Richard D'Alli	Dr. Henderson	A Case Study of Fogarty Subcommittee
Jim Gray	Dr. Jester	Concept Formations and Transfer as a Function of Social Class and Concreteness-Abstractness of Stimuli

Table 1. Individual Study Activities. (Continued)

Student	Supervisor	Topic
Dianne Ingles	(none)*	(none)
John Lynch	Dr. Henderson	A Relationship between Educational Attitudes and Attitudes toward Sanctions
Mary Beth Norris	Dr. Entner	History of University of Florida Married Student Housing
Judy Moye	Dr. Henderson	Research Design for the Measurement of Self-Concepts in Preschool Negro and White Children
Jane Jones	Dr. Curran & Dr. Jester	Research Design: The "In" Dresser in High School
Sandra Poland	Dr. Jester	Mother's Attitudes Toward Children
Kathy Ramers	Dr. Entner	Jacksonville: Site of Crisis in Education
Nancy Riveiro	Dr. Jester	Research Design: The "In" Dresser in High School
April Robinson	Dr. Entner	Teacher Professionalization: A Game
Dale Rubley	Dr. Jester	The Impact of Sanctions upon Education Major at the University of Florida
Gail Stebor	Dr. Curran & Dr. Gordon	The Underprivileged Negro: Compensatory Education
Tom Summers	Dr. Henderson	Investigation of Degree of Discontent Among Upper Division Students at University of Florida 1967

Table 1. Individual Study Activities. (Continued)

Student	Supervisor	Topic
Carolyn West	Dr. Curran & Dr. Jester	The Testing of Self-Concepts of Negro First Grade Children
Sharon Witte	Dr. Curran & Dr. Gordon	Study of Professors' Attitudes Concerning University Relationships with Students

* Mrs. Ingles was registered in extra courses to permit her to graduate at the end of the summer.

3) Active Participation in an Ongoing Research Project:

Each student was assigned to an ongoing research project as a research apprentice. Three credit hours were allowed each student for participation in the project. The projects, directors, and supporting agencies are shown in Table 2.

Table 2. Projects and Project Directors.

Title	Investigator	Support	No. of Apprentices
Investigation of Observer-Judge Rating of Teacher Competence	B. B. Brown Education	United States Office of Education	1
Programming for Mental Health in Campus Marriage & Preventive Action in College Mental Health	Carl Clarke Ben Barger Psychology	National Institute of Mental Health	2

Table 2. Projects and Project Directors. (Continued)

Title	Investigator	Support	No. of Apprentices
High School Self-Evaluation and Curriculum Change	V. A. Hines Wm. Alexander Education	United States Office of Education	2
Community Study on Campus Marriage	Carol Taylor Anthropology	College of Nursing University of Florida	2
Infant Stimulation Project	Ira J. Gordon J. Ronald Lally	Ford Foundation Children's Bureau	4
Head Start Orientation Program	Janet McCracken J. Bauch	Office of Economic Opportunity	4
Self-Concepts of Negro First Grade Children	David Aspy	Orange County Board of Education	1
Hawthorne Self-Concept Study (Southeastern Educational Laboratory)	H. H. McAshan Luther Rogers	Southeastern Educational Laboratory (U.S.O.E.)	3

Since each of the courses was assigned three credit hours, the total load for each student was fifteen credit hours for the full trimester. Some of the elective courses were scheduled for half of the trimester producing some imbalance of load for a few of the students. All in all, however, no real problems resulted from this arrangement. The above description reflects the changes recommended at the conclusion of the summer 1966 program. The required courses in Psychology and Anthropology were dropped in favor of elective courses and the seminar in Issues and Problems in Education was made a requirement with its alternative choice in Political Science being replaced by a more general elective. The assignment of credit for participation in ongoing

research was added in order that work in other areas would not be impaired due to excessive demands on the students' time. In addition, the provision of academic credit for participation in research reflects a shift in attitude at the undergraduate level. The success of the students in working with ongoing research projects will provide support for the introduction of a regular apprenticeship program in educational research at the undergraduate level. Previously, such programs have been restricted solely to graduate students with a major in educational research. By assigning such an apprenticeship to undergraduates preparing for a teaching career, it would be expected that the students might gain insights and attitudes toward educational research which would enable them to be of help rather than a hindrance to the educational researcher attempting research in their classrooms. The success of the apprenticeship program will be discussed completely in the evaluation section of this report.

EVALUATION OF THE PROGRAM

Objectives

Recruitment. A primary goal of the program was to recruit bright undergraduate students from education and the arts and sciences. This objective was largely accomplished although even with early publicity, the response was not as large as was anticipated. The reason for the low response is not clear although one reasonable after the fact explanation is that the University of Florida shifted from a trimester to a quarter system. There is some reason to suspect that students were uneasy about this shift and that they were unwilling to "jeopardize" their position by enrolling in a course of study which was strictly elective. The total number of inquiries is estimated at 40 and some of these were made by students who were clearly not qualified for the program. Applications were submitted by 24 students and 18 were admitted to the program. Of these 18 students, the grade point of one was sufficiently low that admission was definitely questionable and the grade points of eight others were lower than the original lower limit of 3.0 average. Since all of these students were highly recommended, they were accepted into the program. The success of the program, of course, cannot be measured by the student's prior grade point average. Faculty and apprenticeship supervisors responses to a questionnaire indicates the success of the selections which were made. The results of the evaluations of the students are shown in Tables 3 and 4.

Table 3. Apprentice Directors' Evaluation of Students (n = seven apprentice directors).

1. How does the work of the students compare with the work of new graduate students?	
Equal or better	7
No basis for judgment	0
Less sophisticated	0
2. Was the student's time used effectively, or should it have been approached differently?	
Yes	5
No	0
No comment	2
3. Did the student display commitment to the apprenticeship project?	
Yes	7
No	0
No comment	0
4. Did the student require persistent supervision?	
Yes	2
No	5
No comment	0

Table 4. Evaluation by Faculty who Dealt Directly with Students (n = eleven faculty members).

1. Was the caliber of the students as high as you were led to expect?	
Equal or better	10
Not as good	1
No comment	0

Table 4. Evaluation by Faculty who Dealt Directly with Students (n = eleven faculty members). (Continued)

2. Did you notice changes in behavior or attitudes as the project progressed?	
Yes	9
No	1
No comment	1
3. Have the students been able to effectively use the University as a community in generating educational concerns?	
Yes	6
No	2
No comment	3

The evaluations were made by both the apprenticeship directors and members of the faculty who conducted courses taken by the students in the program. It can be seen that the students compared favorably with beginning graduate students, notwithstanding the low grade points cited above. It seems clear that the selection of the students on the basis of recommendations has much to recommend it. If the criterion of grade point average had been strictly adhered to, many of the students would not have been admitted to the program. Although prior grade points were below a B, it will be seen that the program gave many of the students the direction which they lacked prior to entering the program.

The recruitment objective of admitting arts and sciences and education students equally was approximated with 10 students from the College of Education and 8 from the College of Arts and Sciences admitted. A problem was discovered in that the flyers circulated to faculty in the College of Arts and Sciences were often mislaid so that students did not receive advance notice of the program. Thus, although the faculty were advised of the program early, the communication was not passed on to the students. Under these conditions, it might be expected that the response would be low. In addition, the honor students in the departments of Psychology and Political Science were able to participate in programs with their respective departments. This made it impossible to recruit the "best" students from these departments. It is a credit to the faculty who were contacted personally that response, although low, was as favorable as it was. Some suggestions

were made by both faculty and students for recruiting in the future. Unfortunately, there were no new concrete suggestions which had not been tried and apparently were only marginally successful.

Specific goals

A variety of techniques was used in the evaluation of the specific goals cited earlier. These techniques consisted of student and faculty responses to a questionnaire built expressly for evaluation of this program; before and after autobiographical accounts from the students; and evaluation of term papers submitted as a requirement of the seminar in problems and issues. The results of the evaluations will be discussed in the same order as the earlier presentation of the specific goals.

It was expected that the students would achieve basic competencies in statistics, measurement, and the design of experiments and studies in education. The students' assessment of their skills was obtained through questionnaire responses. The results are shown in Table 5.

Table 5. Students' Feelings of Competency in Statistics, Measurement, and Research Design (n = 18 students responding).

Relevant Questions	Reaction		
	Yes	No	No Comment
Do you feel prepared to effectively evaluate research? Are you more critical now?	17	0	1
Have you become basically familiar with data processing?	18	0	0
Do you feel more prepared to participate in research projects?	16	0	2

It is clear from Table 5 that the students "felt" that they had attained a basic competency in dealing with the statistics, measurement, and design problems related to educational research. In addition, comments made by both the students and faculty members indicated that application of correct and adequate statistical and design techniques to educational research problems was high. Examples of such comments are shown in Table 6.

Table 6. Student and Faculty Comments Related to Appropriate Use of Statistical Techniques.

"She literally tore the research studies to pieces" (faculty)
"She used the right statistics and did the computations by herself" (faculty)
"He correctly set up and analyzed a simple factorial design" (faculty)
"I just turned them loose and they analyzed and interpreted the data" (faculty)
"I have a usable library of basics and know where to look if I am aware of the need to look into a problem methodically" (student)
"I received a great deal of data collecting techniques in my apprenticeship and I gained a deeper understanding of how research is conducted and what it means" (student)

The success of the individual projects is partially attested to by the variety of endeavors shown in Table 1. Projects ranged from carefully controlled laboratory-type experiments to a historical comparative study. The quality of the work varied somewhat but was generally high. In two cases, the students were assigned grades of "C" for their individual projects. This very likely reflected the work output of the students rather than the quality of the original ideas. One of the students assigned the low grade was one of the "low grade point" admissions. Again, this was probably the reflection of a rather enduring attitude toward responsibility for one's own academic efforts. The particular student is highly capable in an outside area and is very active in this area. It was apparent that much time was spent with such outside activities. In this case, it must be admitted, the faculty was unable to reach the student. Generally, however, the degree to which students were reached was high and students assumed responsibility for coordination of their time. One problem which appeared early with respect to the individual projects was that many of the students were uneasy about settling on one area for intensive study. In some cases, it seemed that the students "wanted" to be told what they were required to study. When forced, however, to search out ideas on their own, the response was quite favorable and most of the students were able to find and delineate a problem for study. Some, as indicated in Table 7, made

use of the apprenticeship as a source of ideas. That is, they were able to effectively integrate the individual project with the apprenticeship.

Table 7. Students' Reactions to Individual Study.

Representative Comments
"I actually planned and carried out a 'research project.' Though it was limited by time, money, and skill, it was a beginning step in research which could not be accomplished in a classroom."
"My individual project . . . grew out of my work in the apprenticeship. I used knowledge of statistics taught in class to set up my project and analyze results."
"By observing how teachers react to certain new ideas in education . . . led me to my individual project. I feel that I will be able to do a much better job on my next individual project."
"My individual project . . . gave me a chance to observe the research process and familiarized me with its many problems."
"In short, it [individual project] turned out to be an exercise in research design."
"The individual study directly involved educational research."
"It did make me realize the vast background work that must be done before new findings can be made."
"My apprenticeship project . . . helped me set up my research design for individual projects."

Although some of the comments cited in Table 7 reflect the interrelation between the apprenticeship assignments and the individual work, it seems clear that the process of permitting students to pursue ideas of their own development produces learning experiences which cannot be duplicated in the classroom. Although the students could, and indeed did, repeat some of the many relevant statements about statistics, research, and problems in doing educational research,

it is quite clear that the individual study permitted them the opportunity of integrating what they were able to "say" with what they were able to "do."

In many cases, the apprenticeship assignments were closely integrated with the student's individual projects. This, by itself, speaks well for the impact of the apprenticeship program on the students' thinking. In addition, the apprenticeship directors were solicited for their reactions to the students who worked with them. These reactions are shown in Table 3. The faculty response makes it clear that the students were able to perform adequately and in some cases exceptionally in the capacity of apprentice researchers.

One aim of the research apprenticeship was to provide the students with experience in doing the many diverse tasks involved in the conduct of research. An analysis of time spent at various activities is shown in Table 8. It can be seen that there was time spent in a wide variety of activities consisting of the major tasks involved in doing research.

Table 8. Utilization of Time in Apprenticeship Assignments.

Task	Total Hours	Average hours per student	Average hours per student per week
Data collection	393	21.83	1.56
Data processing	321	17.83	1.27
Data analysis	213	11.83	.84
Design of research	91	5.56	.40
Data reporting	88	4.89	.35
Conferences	146	8.11	.58
Miscellaneous	350	19.43	1.39
Totals	1602	89.43	6.39

The tasks cited in Table 8 are largely self-explanatory. The miscellaneous category includes such tasks as waiting, running errands, transportation time, etc. Although such activities are not generally thought of as "educational research," they definitely are a part of any research activity. The average amounts of time shown in Table 8 appear to be roughly representative of the proportions of time spent at the various tasks in the conduct of research. The design of research category appears to be a little low with respect to the time that is actually spent by researchers in this activity. This is certainly due to the fact that the students were assigned to ongoing research projects. The major portion of planning was done prior to the students' involvement with the projects.

The students were asked to evaluate the apprenticeship study on a five point scale. The results are summarized in Table 9. The students clearly thought the apprenticeship work to be a worthwhile endeavor.

Table 9. Students' Evaluation of Apprenticeship Work.

Rating	Number Responding
Exciting	4
Good Learning	12
Learning	0
Useful	2
Chore	0

A very important specific goal of the program was to maximize student-faculty contact. The students were asked for their reactions to the amount of contact they were able to elicit from faculty and staff members.

Table 10. Comments Made by Students with Respect to Student-Faculty Interaction.

Representative Comments
"Interaction with the faculty has been one of the more rewarding aspects of the program."

Table 10. Comments Made by Students with Respect to Student-Faculty Interaction. (Continued)

Representative Comments
"Both Dr . . . and Dr. . . . have been invaluably helpful in consultations on my research project and were always available for discussion of any problem."
"The personal interest helped give a feeling of importance which in turn gave motivation to do well."
" . . . plenty, although I don't think there could be <u>too</u> much with the caliber of men we had to interact with."
"Yes, [sufficient interaction] however, as with other problems involving communication, one will tell you what to do and another will tell you something different."
" . . . more than usual. I think this is one of the high points of the program."
" . . . more than usual . . . plenty for me."
"Much more than ever before. It was a real nice change."
"I always felt that I could say what I wanted without fear of being belittled and/or labelled impertinent."
"I have realized that I can go to a professor who isn't one of my class teachers to seek information."

Of the eighteen students in the program, sixteen responded with "more than usual" and two with "the same as usual" to the query, "has there been enough interaction with the faculty?" The comments included in Table 10 are representative of those volunteered by the students. Several important dimensions must be noted with respect to the comments. The students obviously appreciated the faculty contact. Whether or not motivation is, in fact, altered by faculty support, the students seem to feel that it does make a difference in the way they respond. The students found that professors were, in general, available for consultation and help. Although the majority of the contact was made with faculty directly associated with the project,

the University community as a whole could be expected to respond favorably to student inquiries and student problems. A sidelight which is not reflected directly in the comments cited in Table 10 is that students also discovered that faculty could be contacted even though they are extremely busy at their own tasks. The students apparently now see the university faculty as generally supporting rather than as generally threatening.

At the outset, the program was designed to encourage a free flow of ideas among the students from the College of Arts and Sciences and students from the College of Education. The students were asked their reactions to their fellow students. Fifteen felt that their fellow students had been helpful in developing an understanding of educational research, one felt they had not been, and two expressed no comment. Some reactions made by the students are illustrative of the nature of the students as a group and of the degree to which they felt the group was facilitating. The reactions are presented in Table 11.

Table 11. Students' Reactions to Fellow Students and to the Group.

Representative Comments
"Probably by sharing our opinions on what we expected from educational research, we learned more than any book could have said."
"I have begun to see that there are many views towards various problems and that even though some may be better than others, there is no 'right' answer."
"It [the group] has shown vividly the pressure of group processes on the individual when the group is seen as a process rather than the physical proximity of autonomous trusting individuals."
"I feel that we worked together more than other students do."
"The group discussion helped to clarify opinions."
"There were some very bright and stimulating talkers, but there were some people in there who were wasting their time and everybody else's."
"A wonderful group!"

Table 11. Students' Reactions to Fellow Students and to the Group. (Continued)

Representative Comments
"Students showed a genuine concern for each other."
"Students were bluffers, two faced, lazy, very critical of other individual students."
"Interesting, puzzling, opinionated, valuable."
"Eager, bright, sensitive, searching friends."

In summarizing the comments in Table 11, it must be noted that in the main they picture the students as being helpful to each other, understanding, and willing to express opinions. The one exceptionally negative reaction has been included as probably representative of the three persons who were either negative or did not respond. As in most human relations, it would be strange, indeed, if everyone liked everything. All in all, the group worked very effectively together and were willing to both express themselves and listen to others. Although there were several students who seemed to become "clique-ish" at one point in the program, this clique apparently dissolved and was absorbed by the group as a whole. The free interchange of ideas among all students was apparent and it was clear that the sources of the ideas were as varied as the ideas themselves. It seems that the arts and sciences students involved in the program did get a taste of education, and that the taste was palatable to them. In addition, the animosity which was expressed toward one student who came to the program from the physical sciences (and was perceived by the others as knowing all about "science" but nothing about education) dissolved and he became a full-fledged member of the group. He became close enough to students of education that he is now sharing an off campus room with two of them. By the end of the program the students had lost much of their sensitivity to the origins of their fellow students and seemed to be more sensitive to what the fellow student had to contribute to the group as a whole.

Perhaps the most important aspect of the program has been that of developing favorable attitudes toward education and educational research. It has been implicit throughout this report that students'

attitudes were generally favorable. A number of factors contribute further to an assessment of how much change actually took place during the program. Students were asked two questions at the conclusion of the program related to the nature of their attitudes. One of the questions was, "What were your attitudes toward educational research and your expectations of this project when you began?" The other was, "What are your feelings toward research and researchers now?" The students' responses were evaluated into three categories, naive, favorable, or unfavorable. The results are summarized in Table 12.

Table 12. Students' Change in Attitude During the Program.

Nature of Attitude Before to After	Number Responding
Naive to Favorable	13
Naive to Unfavorable	1
Unfavorable to Unfavorable	1
Favorable to Favorable	2
Unfavorable to Favorable	1

It is apparent that the program had an impact on the way students feel about educational research. Although all of the responses categorized as "naive" do not represent precisely the same quality, they can be considered as representing the fact that students did not know enough about educational research to make a clear judgment. If the program has done no more than increase knowledge to the point where a judgment could be made, we would consider it to be a success.

Although an indirect way of assessing attitudes toward the program, a comparison of plans before and after participation reflects changes resulting from the program. At the outset the students were asked to write a brief autobiography which included a statement of what their future plans were. At the conclusion of the program, the students were again asked to state their future plans and goals. An evaluation of the before and after responses is presented in Table 13.

Table 13. Students' Plans Before and After the Program.

Nature of Plans	Before	After
Teaching	8	2
Graduate School	6	13
Educational Research	1	7
Other Academic Areas	5	6
Other Plans	4	3

We are a bit chagrined to have taken six promising future teachers and to have gained their commitment to educational research. However, with respect to the goals of the program, we succeeded where we intended to succeed. The commitment we have obtained to educational research should result in an earlier concentration and less wasted motion for the students when they enter graduate school. For those who are not planning future careers as educational researchers, the program clearly will have helped them to aid rather than thwart the conduct of scientific research in their classrooms. The students' appreciation of adequate control in research has been heightened immeasurably and their attitudes toward research have generally become favorable. Some comments made by the students are shown in Table 14 and are representative of the shift in attitude.

Table 14. Representative Comments Made by Students Toward Educational Research.

Representative Comments
"I am far more critical of work done and see possibilities and need for research everywhere. About researchers, I think few among them deserve the name. They get away with murder. Good researchers are persons to be admired."
"I would very much like to be in research."

Table 14. Representative Comments Made by Students Toward Educational Research. (Continued)

Representative Comments
"It has not affected my interest in research per se, although it has directed that interest toward education."
"I now understand some of the complex problems involved in research."
"I have become so interested that I accepted an assistantship in the research program I had my apprenticeship in and changed my major in graduate school."
"Found many loopholes and yet found possibility to maybe join in and help out with personal efforts."
"I am no longer frightened of the prospects of research and its implications."
"I am now a lot more cautious about research results, knowing that not all of it is well designed or well controlled. The program has made me aware that, as a teacher, there may be times when I will be called upon to be a part of a research project. As a participant I feel I could now be a responsible member and know if the research were good."
"I am much more interested in research especially in education since I am in education."
"I know researchers are really human, now."
"Before, I considered research and researchers as rather boring with most of the research conducted in labs or through questionnaires with little or no contact with the actual people. Now I find it exciting and personal."
"I think research is a vital part of education, a progressive influence and one that is not given enough credit."

Overall Program Evaluation

Students were asked to rank four aspects of the program in terms of effectiveness. The four aspects were individual projects,

apprenticeship, classes, and conferences. The results are shown in Table 15.

Table 15. Students' Ranking of Effectiveness of Four Aspects of Overall Program.

Program Aspect	Rank				Mean Rank	Median Rank
	1 Freq	2 Freq	3 Freq	4 Freq		
Individual Project*	7	3	3	4	2.23	1.50
Apprenticeship	4	5	5	4	2.50	2.50
Classes	2	2	5	9	2.00	2.00
Conferences	2	2	5	9	3.17	3.50

*One student was not assigned an individual project.

The frequencies of choices for first rank place the individual project as the most effective part of the program. Classes are ranked second, apprenticeships third and conferences fourth. A comparison of the four program aspects by mean and median rankings lead to approximately the same conclusion. Since the ranks cannot legitimately be considered as either continuous or as equal interval, the values can be considered only approximation to real values. It is apparent, however, that the individual projects and classes were seen by the students as having the most value and effectiveness. One reason for the choice of individual projects as the most effective part of the program may be reflected in the students' earlier appraisal of close faculty contact as well as in the opportunity to work rather independently. It was a function of the individual project to provide the student with as much help as he needed but at the same time to permit the student freedom in his choice of alternatives.

Faculty participants in the program generally rated it favorably and unanimously agreed to participate in a similar program again. There were, however, problems similar to those encountered in the 1966 programs related to the lack of communication among all participants. Some illustrative comments are presented in Table 16 which will help to clarify the faculty participants' reactions.

Table 16. Faculty Reactions to Communication Among Participants.

Representative Comments
"I believe there would be an advantage in having a group meeting of all trainees and all research assistants concerned for general review of mutual expectations."
"More briefing on the expectations for the students and responsibility of the superior."
"More orientation to the program would have been useful."
"Only more orientation and more singleness of direction among all staff members associated with it."
"Quite sufficient and well done. Periodic communication among participants in terms of the objectives of the total program might have increased the effectiveness."

The problem of interrelating faculty members from diverse disciplines and many areas of the campus is not a new one. Although a high degree of success was not reached, communication through the students was probably higher than normal. Future programs should schedule regular periodic staff meetings as an integral part of the program rather than rely on those persons who can find a common time for meeting. Simple problems of scheduling appeared to prevent some staff members who were supervising apprenticeship students from attending the orientation meeting at the beginning of the project. Although the project directors were able to talk individually with other participants, communication among participants was, indeed, very limited. Regularly scheduled staff meetings would overcome such a lack of communication.

Students' evaluations of the overall program are reflected in their evaluation of the parts of the program. It is apparent that for most of the students their participation was one of the highpoints of their college career. When students were asked, "What were the most difficulties in the project?" a wide range of responses were elicited. The majority, however, responded with "working on my own" and "just getting going" as the major difficulty with a variety of other responses appended.

Generally, the program has been successful. Capable students have become committed to the field of educational research and some have initiated their training. Some of the weaknesses in the original 1966 program were not completely rectified with the most apparent being the lack of intercommunication among faculty participants. The change to an elective system in the basic disciplines was generally effective and of value to the students for both their own development and their degree programs.

Plans are presently underway to introduce a research training program at the undergraduate level as a part of the regular college offerings. The high level of success with both the apprenticeship and individual study programs during this pilot study attests to the value of including them in the regular college program.

PROGRAM REPORTS

Application Summary

1. Approximate number of inquiries from prospective trainees (letter or conversation).	40
2. Number of completed applications received.	24
3. Number of first rank applications (applicants who are well-qualified whether or not they were offered admission).	15
4. How many applicants were offered admission?	19

Trainee Summary

1. Number of trainees initially accepted in program.	18
2. Number of trainees enrolled at the beginning of the program.	18
3. Number of trainees who completed program.	18

Financial Summary

Item	Budgeted	Committed
Trainee Support	5,000.00	4,500.00
Institutional Allowance	5,000.00*	
Direct Costs		
1. Personnel	9,810.00	9,547.33
2. Office Supplies and Announcements	150.00	150.00
3. Travel	400.00	000.00
4. Other Direct Costs	579.00	577.70
	10,939.00	10,275.03
Stipends	5,000.00	4,500.00
Indirect Costs	875.00	768.05
	16,814.00	15,543.08

*Absorbed in direct costs: See original grant support.